substitute drawings for these proposed changes, and amended the Specification to correct for informalities.

Claims 2-3 and 11 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 2 has been canceled, and therefore the rejection with respect to claim 2 is considered moot. Claims 3 and 11 have been amended to further clarify the feature of the "surrounding area", as defined in amended claim 1. For these reasons, withdrawal of this rejection is respectfully requested.

Claims 1-6, 10-11, and 25-26 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Suzuki et al. (U.S. Patent No. 6,256,082). In response, Applicants have canceled claims 2 and 17 and amended claim 1 to include the subject matter of these claims, and respectfully traverse. Applicants respectfully traverse because the cited references, taken alone or in combination, do not disclose or suggest a liquid crystal display device that has an insulating layer comprising a plurality of insulating patterns that control an in-plane direction of liquid crystal molecules in a liquid crystal layer when a voltage is applied across electrodes.

Suzuki is directed to a liquid crystal display which has a liquid crystal layer between two substrates that each have an electrode (see the Abstract). Suzuki teaches the use of a uniform dielectric film. Therefore, the liquid crystal device of Suzuki cannot provide the effect of a modified electric field, as in the present invention.

The present invention provides a liquid crystal display device having dielectric patterns for controlling the direction of the liquid crystal molecules. The dielectric patterns are used to modify the electric field formed between a pair of electrodes. The use of the dielectric pattern results in the in-plane direction of the liquid crystal molecules being controlled by the dielectric patterns. For this reason, and the inclusion of claim 17 into claim 1, Applicants request withdrawal of the § 102(e) rejection to claim 1. Claims 2-6, 10-11, and 25-26 are dependent from claim 1, and are considered allowable based on their chain of dependency.

Claims 7-8 stand rejected under 35 U.S.C. § 103(a) as being obvious over Koma et al (U.S. Patent No. 6,362,864) in view of Suzuki. Claims 7-8 depend upon claim 1, so they necessarily include all the features of independent claim 1 plus additional features. Thus, Applicants submit that the § 103(a) rejection of claims 7-8 has been overcome for the same reasons mentioned above to overcome the § 102(e) rejection of independent claim 1. Applicants respectfully request that the § 103(a) rejection of claims 7-8 also be withdrawn.

Claims 13-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hisatake et al. (U.S. Patent No. 5,434,690) in view of Suzuki. Applicants traverse the rejection for the reasons stated above for the rejection to claim 1 and because Hisatake teaches a liquid crystal display device that operates under a different principle from the present invention. That is, the Hisatake reference teaches away from the present invention by

[illegible]

More specifically, Hisatake states in column 10, line 15 et seq. that "The present invention is to enhance the light scattering effect utilizing the condition that the directions of liquid crystal molecules change by the presence or absence of an applied voltage having the component of traverse electric field, in other words tilted electric field, if the liquid crystal is not arranged in the uniform twist." Further, in column 14, line 22 et seq. Hisatake states that "However, even if the liquid crystal component of the negative dielectric anisotropy is used, the liquid crystal molecules are slightly tilted from the vertical direction (90°), resulting in only one degree of freedom when the upper and lower substrates form the uniformly tilted arrangement." Therefore, this is not within the objectives of the present invention. Furthermore, there is no teaching in Hisatake about the use of a plurality of insulating patterns.

Thus, Applicants believe that there is no motivation for a person skilled in the art to combine the teachings of Suzuki with Hisatake, contrary to the assertion of the Examiner. For these reasons, withdrawal of the rejection to claims 13-24 is respectfully requested.

Claims 9 and 12 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kondo et al. (U.S. Patent No. 6,341,004) in view of Suzuki. Claims 9 and 12 depend upon claim 1, so they necessarily include all the features of independent claim 1 plus additional features. Thus, Applicants submit that the § 103(a) rejection of claims 9 and 12 has been

[illegible]

independent claim 1. Applicants respectfully request that the § 103(a) rejection of claims 9 and 12 also be withdrawn.

Attached hereto is a marked-up version of the changes made to the Specification and claims by the current amendment. The attached Appendix is captioned "**Version with Markings to Show Changes Made**."

Applicants submit that this Application is in condition for allowance, which is respectfully requested. The Examiner is invited to contact the undersigned attorney if an interview would expedite the prosecution.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Please replace the paragraph beginning on page 1, line 14, with the following rewritten paragraph:

In recent years, liquid crystal display devices have been widely used~~,~~ because of their advantageous features, such as ~~the~~ thinness, lightness, low driving voltage, and low power consumption ~~power~~. Particularly, active-matrix liquid crystal display devices having an active element for each pixel, such as TFT-LCDs (Thin Film Transistor Liquid Crystal Displays) have been becoming comparable with CRTs in terms of display quality.

Please replace the paragraph beginning on page 1, line 23, with the following rewritten paragraph:

However, the use of LCDs has been limited due to a narrow viewing angle. In order to eliminate this problem, various techniques have been suggested. Among those techniques, there are many techniques in which electrodes are patterned so as to control the inclinations of liquid molecules in various directions by changing the field distribution in cells. However, the electrode patterning techniques cause ~~the~~ problems described later herein. The present invention can be applied to all of the electrode patterning techniques and easily solve those problems.

Please replace the paragraph beginning on page 2, line 25, with the following rewritten paragraph:

As shown in FIG. 1B, a voltage is applied between the alignment layers 10 and 11, thereby straightening the liquid crystal molecules and eliminating the twist. However, on the surfaces of the alignment layers 10 and 11, the liquid crystal molecules remain along the alignment layers 10 and 11 due to the strong orientation force. In this situation, the liquid crystal 12 is almost homeotropic with the linearly polarized light, and no rotation of the polarizing direction occurs. Here, the display is in a dark state. When the voltage is zero, the display returns to a bright state due to the orientation force y on the alignment layers.

Please replace the paragraph beginning on page 3, line 37, with the following rewritten paragraph:

There have been dramatic improvements in the TN-type TFT-LCD production techniques, and, in recent years, the TN-type TFT-LCD production techniques excel~~exceels~~ CRTs in contrast ratio and color reproducibility. However, the LCDs have a narrow viewing angle. Particularly, a TN-type has only a very narrow viewing angle in the vertical direction. Viewed from some other direction, the brightness of the black state increases, making the image whitish. Viewed~~Viewd~~ from the other direction, the display becomes dark, and gray-[illegible]

Please replace the paragraph beginning on page 6, line 17, with the following rewritten paragraph:

In the IPS method, the liquid crystal are switched in the horizontal direction. As mentioned before, when the liquid crystal molecules are aligned with an inclined angle to the substrates, the birefringence varies with the viewing angle direction. The switching is carried out in the horizontal direction so as to steady the birefringence and obtain excellent viewing angle characteristics. However, this method also causes several problems. First of all, the response is very slow, because the switching is carried out with an electrode gap of about 10 μm in the IPS method, compared with the switching with an electrode gap of about 5 μm in the conventional TN method. The response time can be shortened by narrowing the electrode gap, but each two adjacent electrodes needs to have a~~an~~ different electrical potential to apply an electrical field. Otherwise, short-circuiting will ~~be easy to~~ occur between the adjacent electrodes, resulting in a display with defects. To avoid such a problem, each two adjacent electrodes are formed on two different layers, but this simply increases the number of manufacturing processes.

Please replace the paragraph beginning on page 11, line 32, with the following rewritten paragraph:

In the structure shown in FIG. 9A, one transparent insulating film 46 substantially covers ~~the~~ most ~~part~~ of one pixel. The broken lines indicate the lines of electric force when a voltage is applied between the ITO electrodes 40 and 42. Because of the insulating film 46 (preferably transparent), the lines of electric force incline~~inclines~~ in the direction perpendicular to the ITO electrode 40.

Please replace the paragraph beginning on page 12, line 4, with the following rewritten paragraph:

When no voltage is applied between the ITO electrodes 40 and 42, the liquid crystal molecules 45 of the liquid crystal 44 are~~is~~ orientated perpendicularly to the surface of the ITO electrode 40, as shown in FIG. 10A. FIG. 10 shows a vertical alignment layer 50 on the side of the transparent insulating films 46. When a voltage is applied between the ITO electrodes 40 and 42, the liquid crystal molecules 45 which are not covered with the transparent insulating films 46 start inclining along the inclination of the lines of electric force, as shown in FIG. 10B. If the applied voltage rises, the liquid crystal molecules 45 located at the transparent insulating films 46 start inclining, as shown in FIG. 10C. The liquid crystal molecules 45 then go through the stage shown in FIG. 10D. When the applied voltage becomes high enough, all the liquid crystal molecules 45 are~~lie in~~ almost parallel with the surface of the ITO electrode 40 while actually being orientated perpendicularly to the line of the electric force.

Please replace the paragraph beginning on page 12, line 25, with the following rewritten paragraph:

By forming the insulating (preferably transparent) films 46 that vary~~varies~~ the orientations of the electric field in a pixel region, the liquid crystal molecules become perpendicular to the lines of electric force created by the applied voltage~~application~~. The orientations of the electric field vary, and a plurality of gradient orientations exist for the liquid crystal. As a result, the brightness variation becomes smaller over a wide range of viewing angles, and the viewing angle characteristics improve. Also, the occurrence of gradation inversion can be restricted.

Please replace the paragraph beginning on page 13, line 14, with the following rewritten paragraph:

In FIG. 9B, each ~~one~~ transparent insulating film 46 covers ~~the~~ most ~~part~~ of one pixel. The broken lines indicate the lines of the electric force created when a voltage is applied between the ITO electrodes 40 and 42. Because of the transparent insulating films 46 and 48, the lines of electric force incline in the direction perpendicular to the ITO electrode 40.

Please replace the paragraph beginning on page 14, line 3, with the following rewritten paragraph

In FIG. 9C, one single transparent insulating film 48 covers ~~the~~ most ~~part~~ of one pixel. The broken lines in FIG. 9C indicate the lines of electric force caused when a voltage is applied between the ITO electrodes 40 and 43. Because of the insulating film 48, the lines of electric force incline in the direction perpendicular to the ITO electrode 40.

Please replace the paragraph beginning on page 14, line 11, with the following rewritten paragraph:

Since the transparent insulating film 48 is formed <u>on</u> only one of the substrates while the other substrate is formed by the narrow striped ITO electrode 43, the orientations of the electric field in the pixel region can be greatly varied.

<u>In the Claims</u>:

Please cancel claims 2 and 17, without prejudice, and amend claims 1, 3, and 11 as follows:

1. (Amended) A liquid crystal display device in which a pair of substrates having electrodes face each other, and liquid crystal is sealed between the substrates,

said liquid crystal display device including an insulating layer that varies [illegible]

substrates.,

said insulating layer comprising a plurality of insulating patterns each having a dielectric constant different from a dielectric constant of a surrounding area surrounding at least one of said insulating patterns,

said plurality of insulating patterns controlling an in-plane direction of liquid crystal molecules in said liquid crystal when a voltage is applied across said electrodes.

3. (Amended) The liquid crystal display device as claimed in claim 1, wherein said plurality of insulating patterns are connected with each other by an insulating film in said surrounding area, and wherein each of said plurality of~~the~~ insulating patterns~~layer is an insulator that~~ has a thickness different from a thickness of said insulating layer in said surrounding area.

11. (Amended) The liquid crystal display device as claimed in claim 1, wherein said plurality of insulating patterns are connected with each other by an insulating film in said surrounding area, and wherein each of the insulating ~~layer is~~ patterns comprises a vertical alignment layer that has a thickness different from a thickness of said insulating layer in said surrounding area.